KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF ELECTRICAL ENGINEERING

EE 200 EXAMINATION

DIGITAL LOGIC CIRCUIT DESIGN

EXAMINATION TYPE   :   Major Examination I

DATE   :   October 15, 2005

Student's name :	
I. D. # :	
Section :	03

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Instructor : Dr. Mahmoud M. Dawoud

Q.1)   a. Convert the decimal number (48.875) to binary, octal and hexadecimal.

b. Determine the values of x and y, such that $(xy1)_{10} = (253)_8$

c. Convert the hexadecimal number 5A3E.B to octal.

d. Perform the following arithmetic operations. The binary numbers are expressed in unsigned form.

      1)   10110.11 + 110.1

      3)   101111 x 1111

e.   Express the decimal number 94.25 in BCD, and in Excess-3.

f.   What is the largest decimal number that can be represented by 10 bits using base 2?

g.   What is the largest decimal number that can be represented by two hexadecimal digits?

Q.2)   a.   Perform the following arithmetic operation in binary using the signed 2's complement representation for negative numbers. Use 8 bits to represent each number.

    (-82) + (+65)

b.   Reduce each of the following expressions to a minimal sum of products expression, by algebraic   manipulation, and draw the logic circuit implementing the simplified expressions.

    1. $F(a,b,c)=a'b'+bc+abc+a'bc$

    2. $F(A,B,C)=(A'+B)(A+C)(A+C')$

    3. $F(w,x,y,z)=x'y'z+xy'z+x'y'z'+wy+xy'z'$

Q.3) a. Express the following function in a canonical sum of products form, sum of minterms and product of maxterms.

$$F(A,B,C,D)=A'B'C'D'+A'B'C'+AB'C'+B'CD'+ABCD'$$

b. Construct a truth table for the function F(a,b,c,d) , which is = 1 if a = 1 and (b,c,d) consists of an odd number of 1's, or if the number represented by (b,c,d) is divisible by 2(exclusive of 0), regardless of the value of a. Express the function as a sum of minterms and simplify it in SOP form using Karnaugh map.

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